A.34 Legenere (*Legenere limosa*)

A.34.1 Legal Status

Legenere (*Legenere limosa*) is not listed under either federal or California Endangered Species Acts. Legenere has been designated as sensitive by the Bureau of Land Management, which means that the Bureau of Land Management State Director calls for special management consideration of this species on Bureau of Land Management-administered lands. Its Heritage Ranking in the California Natural Diversity Database is G2/S2.2 which means that globally (G) and within the state (S) there are either between six to 20 viable element occurrences of this species, 1,000 to 3,000 individuals of this species, or 2,000 to 10,000 acres where this species occurs. Its state threat level rank is "threatened."

The California Native Plant Society (CNPS) List ranking of 1B.1 for legenere indicates that it is rare, threatened, or endangered in California and elsewhere, and is considered by CNPS to be seriously endangered in California with more than 80 percent of occurrences threatened. Plants with a List rank of 1B are considered by the California Native Plant Society to meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the California Fish and Game Code.

A.34.2 Species Distribution and Status

Range and Status

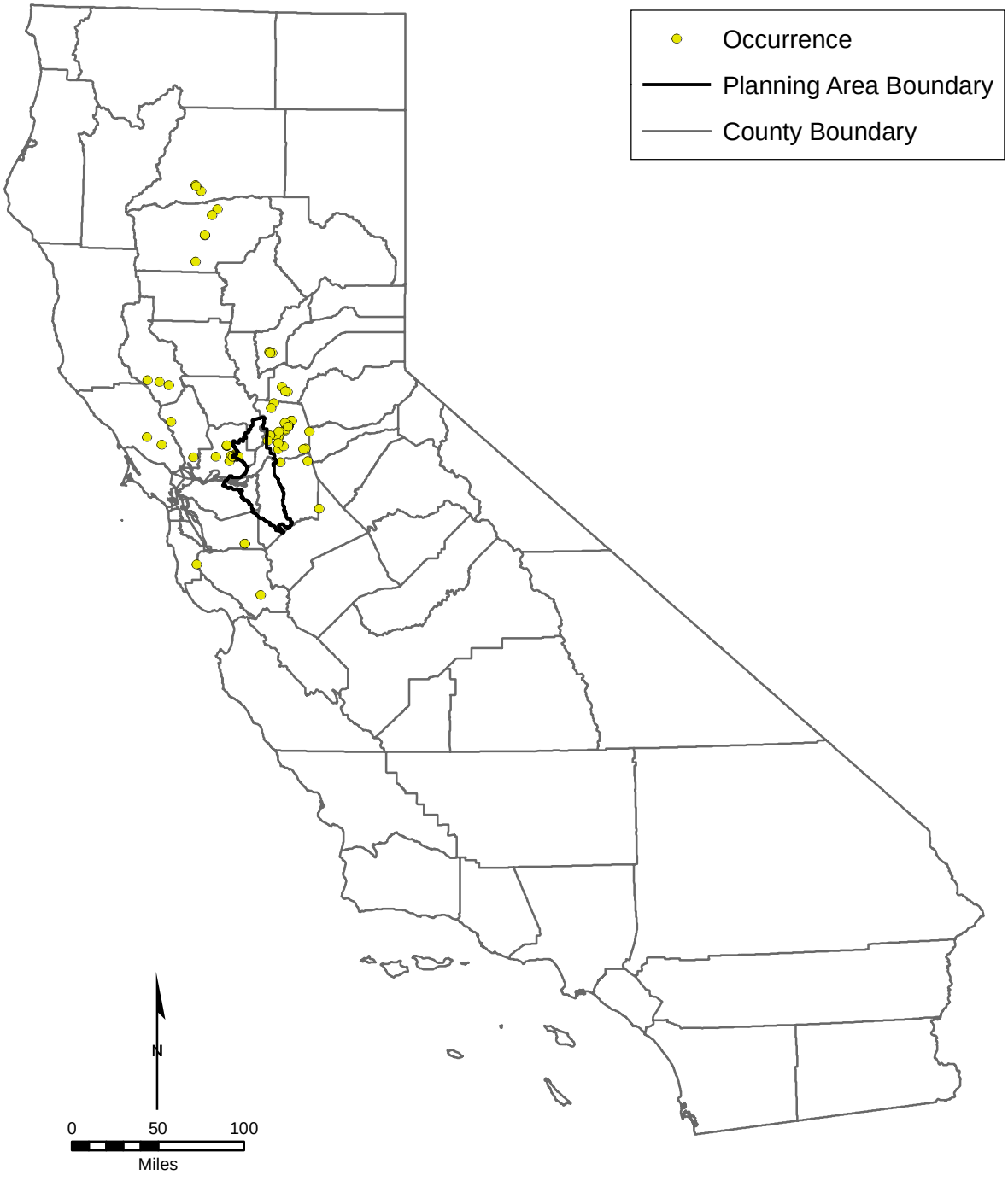
Legenere's range extends from southern Shasta County to southern Santa Clara County (Figure A.34.1). It is found on bottom lands and alluvial terraces in the Sacramento Valley with its distribution at the south end of the Sacramento Valley bifurcated by the Delta (CNDDB 2008). It occurs in the extreme northeastern part of the San Joaquin Valley and is also found on valley floors and margins in both the northern end of Southern Coast Range in San Mateo, Alameda, and Santa Clara counties and the southern end of the Northern Coast Range in Sonoma and Napa counties (CNDDB 2008).

Distribution and Status in the Planning Area

The only reported occurrences of legenere in the BDCP Planning Area are from vernal pools, vernal swales, and alkaline flats in vernal pool grasslands in the greater Jepson Prairie area (Figure A.34.2) (Witham 2003, Buck 2004, Witham 2006, Barbour et al. 2007, Lazar 2007, CNDDB 2008). Recorded occurrences in western Sacramento and San Joaquin counties are immediately east of the eastern boundary of the BDCP Planning Area.

A.34.3 Habitat Requirements and Special Considerations

Throughout its distribution, legenere occurs in vernal pools, vernal swales, pools in seasonal streambeds, vernal marshes, and stock ponds (CNDDB 2008). Occurrence records often state that it is found with long inundation indicator species such as pale spikerush (*Eleocharis macrostachya*), but on the clay soils of the greater Jepson Prairie area it is found in a range of microtopographic positions in vernal pool grassland vegetation that typically have a high cover of the non-native annual grass *Lolium multiflorum* (Witham 2006, Barbour et al. 2007, Lazar 2007, CNDDB 2008).



Source: California Department of Fish and Game, CNDDB, 2008.
Consortium of California Herbaria, 2008.

Figure A.34.1. Legenere Statewide Recorded Occurrences

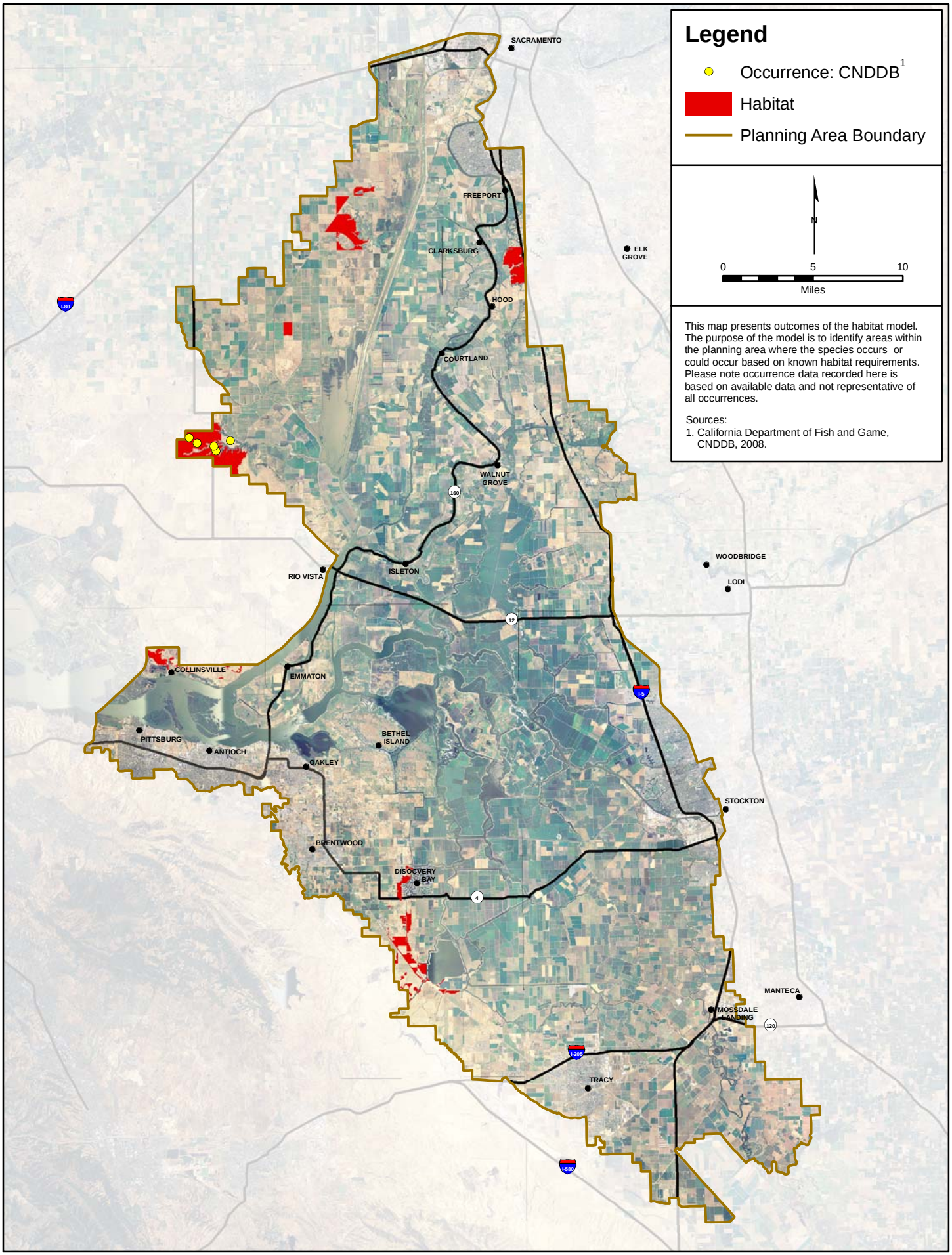


Figure A.34.2. Legenere Habitat Model and Recorded Occurrences

In a large multiple-year vernal pool study, the occurrence of vegetative plants in particular vernal pools was found to fluctuate dramatically with the species disappearing and reappearing in some years (Buck 2004, Barbour et al. 2007). These fluctuations can occur for decades as one occurrence observed in 1961 was not observed in 1971, 1980, or 1983 but was observed again in 1991 (CNDDB 2008). Legenere species may respond positively to dry season soil disturbances as one occurrence in Sacramento County was reported to support up to 1,000 to 10,000 plants in 1991 despite having been "…disked annually for firebreak," but no plants were observed during a 2007 survey (CNDDB 2008).

A.34.4 Life History

Legenere is a small submerged to emergent aquatic annual herbaceous plant during the wet season when habitat is ponded that becomes a 10 to 30 cm long sprawling terrestrial plant at the end of the wet season as the habitat dries. The small, two to10 mm long, narrow leaves support flowers in the upper axils of the characteristic zigzag appearing stem (Hickman 1993). Because of its small size and inconspicuous white flowers, it is difficult to detect during field surveys and may be frequently overlooked (Anonymous 2008). Nothing is known about its pollination biology, seed germination characteristics, or many other important biological and ecological characteristics.

A.34.5 Threats and Stressors

Development, intensive agriculture, and exotic plant species (especially *Lolium multiflorum*) are considered to be the primary threats to legenere (Showers 1988, Showers 1996, Dawson et al. 2007, CNDDB 2008).

A.34.6 Relevant Conservation Efforts

The known occurrences in the BDCP Planning Area are protected from development or intensified agriculture under conservation easements (Witham 2006, Barbour et al. 2007, Lazar 2007, CNDDB 2008). Legenere is included in the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). Legenere is a covered species under the permitted San Joaquin County and Natomas Basin HCPs and is proposed for coverage under the Solano County HCP and South Sacramento County HCP/Natural Community Conservation Plan.

A.34.7 Species Habitat Suitability Model

Habitat. Legenere habitat was identified in areas with alkaline soils as Natural Seasonal Wetlands and Grasslands on Antioch (AoA), Capay (Ca, Cc), Clear Lake (Ck), Diablo (DaC), Hillgate (HcA), Marcuse (Mb, Mc, Sb), Marvin (Mf), Pescadero (Pc, Pk), Rincon (Rg), Scribner (245), and Solano (Sh, Sk) soils. For areas along the eastern border of the BDCP Planning Area that do not occur on alkaline soils habit was determined by the presence of vernal pool and swale microtopography. Vegetation types designated as species habitat in this model correspond to the mapped vegetation associations in the BDCP GIS vegetation data layer. Aerial imagery (USDA 2005) and LiDAR elevation data (DWR 2007) were used to determine how intensively parcels included in the model had been farmed as the vegetation data included significant areas of fallow agricultural land that had been misclassified by DFG as various classes of natural vegetation. Parcels without natural vernal pool and swale vegetation signatures and microtopography were deleted from the area of predicted habitat. Additionally, parcels with known occurrences were digitized and included as habitat.

Assumptions. Historical and current records of this species in the BDCP Planning Area indicate that its current distribution is limited to alkaline soil areas with vernal pool and swale microtopography along the eastern border of the BDCP Planning Area (Figure A.34.2) (Witham 2006, CNDDB 2008) and areas with swales and vernal pools along the eastern boundary of the BDCP Planning Area (CNDDB 2008). The vegetation cover is typically a combination of vernal pool adapted species and annual ryegrass (Witham 2006, CNDDB 2008).

A.34.8 Recovery Goals

Although legenere is not a federally listed species, it is included in the Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005). The Recovery Plan explicitly states that its goal is to ensure the long-term conservation of this legenere and 32 other taxa by using an ecosystem level strategy that is based on: 1) current knowledge of the existing conditions of vernal pool communities, 2) the distribution and status of the populations of each of the species, and 3) current and anticipated process that impact vernal pool ecosystems. Because the goal of the Recovery Plan is primarily directed at habitat preservation, its implementation program specifically addresses factors that relate to habitat acquisition and management: 1) habitat protection; 2) adaptive habitat management and monitoring; 3) status surveys; 4) research, and; 5) public participation.

Literature Cited

Anonymous. 2008. Legenere (*Legenre limosa*). Hibiscus. March 7, 2008.

Barbour, M., A. Solomeshch, J. Buck, R. Holland, C. Witham, R. MacDonald, S. Starr, and K. Lazar. 2007. Classification, ecological characterization, and presence of listed plant taxa of vernal pool associations in California. Final report to the USFWS. Sacramento, CA.

Buck, J. 2004. Temporal Vegetation Dynamics in Central and Northern California Vernal Pools. MS Thesis, University of California, Davis, CA.

CNDDB (California Natural Diversity Data Base RareFind). 2008. California Department of Fish and Game, Sacramento, CA. Ver. 3.1.0 with data generated on June 29, 2008.

Dawson, K., K. Veblen, T. Young. 2007. Experimental evidence for an alkali ecotype of Lolium multiflorum, an exotic invasive annual grass in the Central Valley, CA, USA. Biological Invasions. 9: 327-334.

DWR (California Department of Water Resources). 2007. Sacramento-San Joaquin Delta LiDAR surveys.

Hickman, J.C. ed. 1993. The Jepson Manual: Higher Plants of California. Berkeley: University of California Press.

Lazar, K. 2007. Characterization of rare plant species in the vernal pools of California. MS Thesis, University of California, Davis, CA.

Showers, M.T. 1988. *Cordylanthus palmatus* site characterization and aerial photography interpretation, 1-56. California Department of Fish and Game, Sacramento, CA.

Showers, M.T. 1996. *Cordylanthus palmatus* habitat survey, mitigation potential, and management recommendations. Sacramento: PAR Environmental Services, Inc.

USDA (United States Department of Agriculture). 2005. National Agricultural Imaging Program.

USFWS (United States Fish and Wildlife Service). 2005. Recovery plan for vernal pool ecosystems of California and southern Oregon. Region 1, Portland, OR.

Witham, C.W. 2003. Tule Ranch vernal pools botanical resources survey report. Davis: Yolo Basin Foundation.

Witham, C.W. 2006. Greater Jepson Prairie ecosystem regional management plan. Fairfield: Solano Land Trust.